



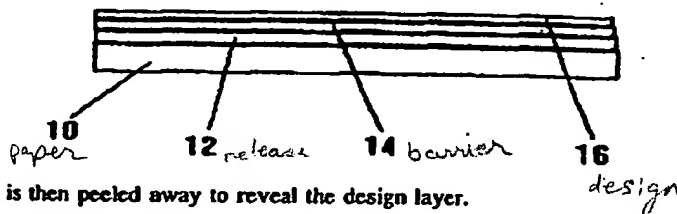
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(21) International Application Number: PCT/GB97/01224 (22) International Filing Date: 2 May 1997 (02.05.97) (30) Priority Data: 9609443.8 4 May 1996 (04.05.96) GB (71) Applicants (for all designated States except US): TULLIS RUSSELL BRITAINS DECALCOMANIA PAPERS LIMITED [GB/GB]; Ivy House Paper Mills, Commercial Road, Hanley, Stoke on Trent ST1 3QS (GB). GRAND PREMIER LIMITED [GB/GB]; Unit 12, Far Green Industrial Estate, Chell Street, Hanley, Stoke on Trent ST1 6AZ (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): SMITH, Michael, James [GB/GB]; 10 Woodbridge Road, Clayton, Newcastle, Staffordshire ST5 4LA (GB). SMITH, Lezlie [GB/GB]; 14 Holden Avenue South, Sneyd Green, Stoke on Trent, Staffordshire ST6 3RG (GB). QUINN, Howard, Anthony [GB/GB]; Brookfield, St. Anne's Vale, Brown Edge, Stoke on Trent ST6 8TA (GB).		(74) Agents: PEARCE, Anthony, Richmond et al.; Marks & Clerk, Alpha Tower, Suffolk Street Queensway, Birmingham, B1 1TT (GB). (81) Designated States: JP, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report.

(54) Title: DECALCOMANIA

(57) Abstract

A surface transfer has a water-permeable paper substrate (10) with a release layer (12) and a barrier layer (14) thereon. A design layer (16) is ink-jet printed onto the barrier layer (14). The transfer is applied to a region of a surface to be decorated so that the design layer contacts the surface. An adhesive is used to secure the design layer (16) to the surface. Subsequently, the paper substrate (10) is dampened to soften the release layer (12) and is then peeled away to reveal the design layer.



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DECALCOMANIA

This invention relates to a transfer specifically intended in use for transferring a design thereon to a surface such as a wall, ceiling, advertising hoarding, sign, vehicle panel, furniture or the like (hereinafter such a transfer will be referred to as a "surface transfer"), and also to a method of use of such a surface transfer.

It is known to provide transfers for decorating articles, eg ceramic tableware, furniture and sports equipment, in which a design layer of the transfer is formed by a screen printing operation. However, such a screen printing operation is not particularly suitable for the production of "one-off" or short production runs of transfers.

Fireable transfers for decorating ceramic articles have been proposed in EP-A-0657309, wherein the required pattern of the design layer is printed in a clear adhesive or adhesive precursor on release paper by an electronically controlled printing process, eg using an ink jet printer. Then, a ceramic decorative or functional material, e.g. ceramic pigment, in finely divided form is applied to the printed adhesive pattern so as to form the pattern in the material. However, such a procedure is quite complicated and expensive and is therefore not particularly suitable for use in the present invention.

It has also been proposed (see "Xerox Engineering Systems ColorGrafx Image Transfer WearCoat" published by Xerox Engineering Systems, 15 November 1994) to form a transfer by mirror-image electrostatic printing of an image using a Xerox 8900 colour printer onto a multilayered medium comprising a base paper carrier and a clear wear-coat layer, the

image being printed onto the latter. In order to effect transfer of the image onto a final substrate, e.g. an adhesive-backed vinyl, the printed paper is positioned on the final substrate and the assembly passed through a hot roll laminator. It is also indicated in this publication that cold roll lamination can also be used but a double-sided adhesive must be applied to the substrate before lamination. After lamination, the base paper carrier is peeled away to reveal the image through the clear wear-coat layer.

It is an object of the present invention to enable the economic production of surface transfers on a one-off or short run basis.

According to one aspect of the present invention, there is provided a surface transfer comprising a design layer removably carried on a backing, wherein the design layer is an ink jet printed layer.

According to another aspect of the present invention, there is provided a method of producing a surface transfer, comprising the step of forming a removable design layer on a backing, wherein the design layer is formed using an ink jet printer.

In a first embodiment, the backing is a water-permeable substrate, e.g. of paper, which can be peeled away after the transfer has been applied to the surface to be decorated. A release layer formed of a water-releasable adhesive (e.g. a gum or dextrin) will usually be provided over the backing to impart peel-away release properties to the latter.

The water-permeable backing preferably has a thickness in the range of 60 to 200 μm , more preferably 90 to 120 μm . The use of such a

backing is advantageous in that it is strong enough to enable it to be handled without damage prior to being adhered to the wall in use, whilst it is sufficiently pliable for it to be applied successfully to a relatively rough or textured wall. A particularly convenient form of backing substrate is a paper such as that sold by Tullis Russell Britains Decalcomania Papers Ltd under the Trade Mark FOTOCAL for the production of transfers using a colour photocopying technique. The paper employed therein has a thickness of about 110 μm .

A barrier layer may be provided under the design layer. Such a barrier layer is preferably in the form of a matt or gloss transparent lacquer, e.g. an acrylic resin. The purpose of this barrier layer is to prevent possible seepage of adhesive used to secure the design layer to the wall to the outer surface of the applied transfer, in use. A barrier layer may be used if a tacky adhesive is employed, since such an adhesive might produce a 'tacky' feel to the touch at the outer applied transfer surface, i.e. the finished surface.

In a second embodiment of surface transfer, the design layer, the optional barrier layer, and the optional barrier layer are provided on a stretchable film. Such a film is preferably biaxially stretchable. In a particularly convenient embodiment, the film is a stretchable cast polypropylene or polyethylene film.

The stretchable film is preferably translucent to allow for positioning of the decal on the wall.

The thickness of the stretchable film is preferably in the region of 20 to 60 μm , most preferably 35 to 45 μm . The stretchable film preferably has

an elongation DT break of 400 to 800%, and preferably has a tensile strength of 10 to 12 N/mm².

The stretchable film is preferably releasably carried on a backing. A low-tack adhesive layer, eg an aqueous based adhesive such as an EVA, PVA or acrylic adhesive, may be used for this purpose. Release of the stretchable film can be effected simply by peeling it from the substrate without the need to moisten the latter.

The backing used to carry the stretchable film is preferably a cast-coated paper, although it may be any other form of backing, e.g. a silicone-impregnated paper. Since the backing for the stretchable film is intended to be peeled away before the transfer is applied to a wall, the above-mentioned preferred thickness limitations for the backing of the first embodiment are no longer required.

The invention also relates to a method of applying a surface transfer.

The design layer may include any form of design, e.g. a design, a picture, a pattern, letters and/or numbers. The design layer may consist of or include advertising material and/or information. This is particularly the case where the surface to be decorated is an advertising hoarding, a vehicle side or rear panel or a sign.

The ink jet printer may be of any type, for example either the continuous type or the so-called "drop-on-demand" type. It will be appreciated that the design layer can be changed at will by appropriate software control of the ink jet printer, thus making the production of "one-off" and short run transfers an economically viable proposition. The ink jet printer will

normally be a multi-colour ink jet printer, although it is within the scope of the present invention to use a single colour ink jet printer.

Whilst it is mainly intended for the surface transfer to be applied to the surface with a user-applied layer of adhesive or varnish, it is within the scope of the present invention for the transfer to be supplied with its own adhesive layer for securing the transfer to the surface.

Using a transfer according to the present invention, it is considered possible to apply the transfer successfully even to relatively rough surfaces, such as textured wallpapers and rough plaster finishes.

It is particularly preferred to use an ink system which is not a standard water-based dye system commonly used for ink jet printers, but a dye or pigment dispersed in a "waxy" medium. Such systems are commonly known as "solid ink" or "phase change" systems in which the ink medium is melted to form a liquid which can be expelled through an ink jet head and finally solidified on the paper. An example of such a system is manufactured by Techtronix Ltd of Wilsonville, Seattle, USA. Alternatively, a solvent-based system containing pigment may be employed. If a water-based ink is used, then a mordant coating will be employed to render the ink insoluble.

It is contemplated that transfers in accordance with the present invention may be produced at any desired site, such as in a store or shop, where a suitable ink jet printer and printer driver will be provided to enable the customer to choose the type of design layer to be printed from a software library of designs. Alternatively, it is envisaged that the customer's own

design could be scanned into a computer so that the scanned image can be printed onto the substrate using the ink jet printer.

Referring now to accompanying Fig. 1, there is schematically illustrated one example of surface transfer according to the present invention. In Fig. 1, the surface transfer comprises a water-permeable paper backing substrate 10 on which are provided, in sequence, a dextrin- or gum-based release layer 12, a barrier layer 14, and an ink-jet printed design layer 16.

In use, an adhesive is applied to the design layer 16 of the transfer or to an area of a wall 18 (see Fig. 2) to be decorated. The adhesive may be a suitable conventional adhesive, an undried varnish, or an undried layer of emulsion paint used to decorate the wall 18. Whilst the adhesive is still in a tacky state, the transfer of Fig. 1 is brought into contact with the surface to be decorated. If necessary or desired, the adhesive is then allowed to dry. Then, the backing substrate 10 is dampened with a wet cloth or the like so as to soften the release layer 12 sufficiently to enable the substrate 10 and release layer 12 to be peeled away, so leaving the design layer 16 and barrier layer adhering to the wall 18 as shown in Fig. 2. The barrier layer 14 is optional. Thus, if desired, a transparent protective layer, e.g. a varnish, may be provided over the transferred design layer 16 in order to protect it from damage in use.

In a modification (not shown), the design layer 16 and the optional barrier layer 14 are provided on a biaxially stretchable cast polypropylene film carried on a cast-coated paper substrate through the intermediary of a low-tack adhesive layer. In a particular example of this modified arrangement, the cast-coated paper substrate has a thickness of

155 μm and has a surface smoothness of $< 0.6 \mu\text{m}$ (Parker Print Surf conditions S10) at its surface upon which the low-tack adhesive layer is provided. The low-tack adhesive layer has a thickness of 15 μm and is an EVA/PVA blend of controlled surface tension, of the type available from Autobond Ltd under the designation 0110/1. The stretchable cast polypropylene film has a thickness of 30 μm and is of the type available from Rexham under the designation CEX001.

The stretchable cast polypropylene film is cut through around the area of the localised design layer to enable localised separation of the appropriate part of the polypropylene film from the paper substrate.

In use, the laminate consisting of the design layer and the polypropylene film are peeled away from the paper substrate prior to application to the wall to be decorated, this being permitted by the low-tack adhesive layer. This laminate is applied against wall to be decorated, after adhesive has been applied to the design layer or to the wall in the manner described above. The stretchable nature of the polypropylene film permits the design layer and the optional barrier layer to lie in intimate contact with the surface of the wall even if it is relatively rough and /or has a textured surface. The polypropylene film is then peeled away to leave the design layer and the optional barrier layer adhering to the wall.

The invention also relates to a method of decorating surfaces generally, and in particular using a surface transfer according to any of the various embodiments of the present invention described above.

CLAIMS

1. A surface transfer comprising a design layer removably carried on a backing, wherein the design layer is an ink jet printed layer.
2. A surface transfer according to claim 1, wherein the ink in the ink-jet printed layer is a phase change ink.
3. A surface transfer according to claim 1, wherein the ink in the ink-jet printed layer is a solvent-based pigment.
4. A surface transfer according to any preceding claim, wherein the backing comprises a water-permeable substrate.
5. A surface transfer according to claim 4, wherein the substrate has a thickness in the range of 60 to 200 μm .
6. A surface transfer according to claim 4, wherein the substrate has a thickness in the range of 90 to 120 μm .
7. A surface transfer according to any preceding claim, wherein a release layer formed of a water-releasable adhesive is provided over the backing.
8. A surface transfer according to claim 7, wherein a transparent barrier layer is provided between the release layer and the design layer.
9. A surface transfer according to claim 1, 2 or 3, wherein the backing includes a substrate to which a stretchable film is removably

secured by an adhesive layer, and wherein the stretchable film removably carries the design layer.

10. A method of decorating a surface, comprising the step of securing the design layer of a surface transfer according to any preceding claim to the surface.

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FIG. 1

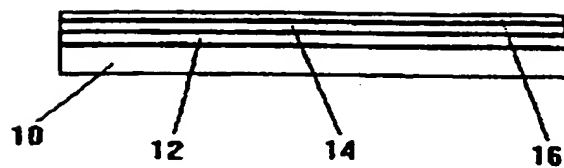
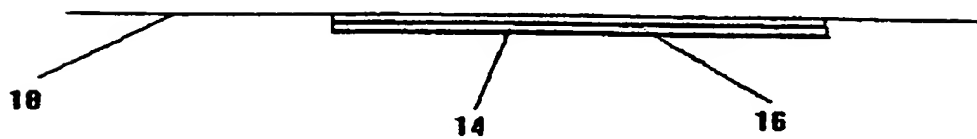


FIG. 2



INTERNATIONAL SEARCH REPORT

Intern. Application No.
PCT/GB 97/01224

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B44C1/165 B41M3/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B44C B41M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95 06564 A (REXHAM GRAPHICS INCORPORATED) 9 March 1995 see page 3, line 4 - page 14, line 17	1-7,10
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☒ Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search

13 August 1997

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